NOTES.

EARLY in this year a petition praying for the incorporation of a British Academy for the Promotion of Historical, Philosophical and Philological Studies was presented to the King, and referred to a committee of the Privy Council. Acting upon the advice of this committee, His Majesty has granted the Academy a Royal Charter. The Charter has not yet been published, but according to the *Times* it states that the Academy aims at "the promotion of the study of moral and political sciences, including history, philosophy, law, politics and economics, archæology and philology." The forty-nine first fellows of the British Academy include leading representatives of many branches of scholarship, but not of poetry or fiction or other departments of pure literature. The Academy will be an independent body, with a separate organisation of its own; and it will not have any closer relationship to the Royal Society than has the Royal Academy of Arts. Our institutions for the advancement of learning and the development of intellectual activity will not, therefore, be coordinated in the way they are in France and several other countries.

THE following reports of eruptions and earthquake shocks have been published during the past few days:—*August* 21.—Severe eruption of Mont Pelée reported by the steamer *Dahomé* to have occurred at noon. No confirmation of the news has reached the French Colonial Office. *August* 22.—Mont Altomonte in Calabria reported from Rome to be in eruption. Subterranean rumblings have been heard, and showers of rock fragments and vapour have been ejected from the crater. An unusually large earthquake was recorded at Shide, in the Isle of Wight. The movement commenced at 3h. 10·9m. a.m. Twenty-five minutes later the amplitude of the large waves exceeded 22 mm. (12″·0). The time interval suggests an origin about 62° distant from the Isle of Wight. Origins for world-shaking earthquakes at this particular distance are Alaska, the West Indies and northern India. Sixty-seven minutes after the maximum movement, but long before its irregular group of followers had ceased to exist, a second group of large waves appeared, the amplitudes of which were 18 mm. (9″·0). The seismographic instruments at observatories in Hungary and Alsace registered several earthquake shocks in the direction from east to west in the afternoon. Two violent shocks were felt at Andishan, and one at Pavlovgk, near St. Petersburg. *August* 25.—Messages from Dominica report that between 10 a.m. and 3 p.m. clouds of dust were seen in the direction of Mont Pelée, while detonations were heard at long intervals until morning. Light showers of volcanic dust fell in Dominica.

DR. L. A. BAUER contributes to *Terrestrial Magnetism and Atmospheric Electricity*, vii. 2, a note on his observations of the magnetic disturbances which occurred during the eruption of Mont Pelée on May 8. At 11h. 59m. a.m., Greenwich mean time, a disturbance occurred which began simultaneously at the two Coast and Geodetic Survey magnetic stations of Cheltenham, Maryland and Baldwin, Kansas. The time of these disturbances was the same as recorded at other observatories, and corresponded to 7h. 54m. of local time at St. Pierre, being about the time at which the principal clock of that town was stopped. The horizontal intensity was the element principally disturbed, and the suddenness with which the disturbance of May 8 began is well illustrated by Dr. Bauer's horizontal intensity curve. Several interesting magnetic disturbances also occurred between April 10 and May 8, possessing striking similarities with each other and with that of May 8, these similarities, both in magnitude and direction, extending to all three elements. During the eruptions, Dr. Bauer observed perturbations of greater or less degree, another striking coincidence occurring on May 20 at the second eruption.

THE nomination of Lord Rayleigh as foreign corresponding member of the Vienna Academy of Sciences has just been confirmed by the Emperor Francis Joseph.

A NUMBER of eminent surgeons representing many countries will be present at the Congress of the Belgian Society of Surgery, to be held at Brussels on September 8–11, when a proposal will be made to found an international society of surgery.

MRS. R. W. LONGFIELD writes from Bandon, co. Cork, Ireland, to say that on August 18 she heard the cuckoo's note distinctly near Bandon. The cry of cuc-koo was repeated several times.

THE address by Sir Archibald Geikie, which we are able to print in full in another part of the present issue, was delivered before a large audience at Cromarty on Friday last, in connection with the celebration of the centenary of Hugh Miller. Many eminent men from America, Canada and Italy, as well as from various parts of the British Isles, assembled to do honour to Miller's memory and to testify to his inspiring influence. The oration delivered by Sir Archibald Geikie was worthy of the occasion, and the eloquent words in which Miller's life and work were described will be read with as much pleasure as they were listened to by the audience privileged to hear them. Among other speakers at the open-air meeting near Hugh Miller's monument, and at the subsequent luncheon, were Principal Rainy, Prof. Clarke, Albany, New York; Sir James Grant, Canada; Dr. Horne, F.R.S., and Prof. Middleton.

IF we may judge from the rarity of reports, the sound of the salutes during the naval review on August 16 does not appear to have been heard at any unusual distance. Mr. H. F. Pinder, writing from Blackbourton, near Bampton, informs us that the salute at 2 p.m. was heard by one, but so far as he knows only by one, person. Earlier on the same day, between 11.30 and 12.15, heavy firing was heard, apparently from the south-south-west, the sound being continuous during the first half-hour. The distance of Blackbourton from Spithead is about 70 miles.

WE learn from the Berlin correspondent of the *Times* that the German Sea Fisheries League recently organised a scientific expedition to ascertain the value of deep-sea fishing in the Baltic. The league, with the assistance of the Ministry of the Interior, chartered the Kiel steamer *Holsatia* and fitted her out for trawl fishing and for scientific investigations. It was also intended to experiment with a view to discover how far the type of boat and the methods of fishing at present in use on the Baltic coast would prove suitable in the open sea. The report has not yet been published, but it appears that no large feeding grounds have been found, and that trawl fishing such as that practised in the North Sea would not pay in the Baltic.

THE thirteeenth annual general meeting of the Institution of Mining Engineers will be held at Newcastle-upon-Tyne on September 17–19, under the presidency of Mr. J. S. Dixon. Among the papers to be read, or taken as read, are the following:—On the probability of finding workable seams of coal in the Carboniferous Limestone or Bernician formation beneath the regular Coal-measures of Northumberland and Durham, with an account of a recent boring made at Chopwell Woods, near Lintz Green, Mr. J. B. Simpson; notes on the correlation of the beds of the Carboniferous series in the north-east and north-west of England, Mr. David Burns; the Marl-slate division of the Permian, Prof. G. A. Lebour; steam-generation by the gases from Beehive Coke-ovens, Mr. M. R. Kirby; and the Fernie coal dust explosion, British Columbia, Mr. William Blakemore.

A NOTE on the progress of the Swedish South Polar expedition appears in the *Times*. The vessel *Antarctic*, with five scientific members of the expedition, left Port Stanley, in the Falkland Islands, on April 11 for South Georgia, U.S.A. The expedition stayed in South Georgia from April 22 to June 15, and during this time a detailed survey was made of Cumberland Bay, one of the largest bays in South Georgia. Investigations into the natural history of Cumberland Bay were carried on, and zoological collections brought home from depths as great as 2700 metres. Soundings have given depths up to 5997 metres north-west from South Georgia. The expedition returned to Port Stanley on July 4, and will up to the end of September carry on work around the Falkland Islands and in Tierra del Fuego. In October, the *Antarctic* will start for Graham Land, in the Antarctic Ocean.

THE United States National Museum has just issued a printed list (24 pages) of the meteorites acquired for the Washington collection before January 1, 1902. The list, which is intended mainly to facilitate exchanges and the increase of the collection, is alphabetically arranged, and gives for each of the meteorites the weight in grams, the date of fall or find, and a brief description of the more salient characters. As many as 348 falls are represented, 143 being those of meteoric iron. There are three full-page plates, photographic reproductions; one illustrates the arrangement of the specimens for exhibition, while the two others are pictures of the Allegan and Casas Grandes meteorites. The list has been prepared by Mr. Wirt Tassin, assistant curator in the Division of Mineralogy.

IN vol. xxiv. of the *Proceedings* of the United States National Museum, Mr. G. P. Merrill gives a detailed description of fragments of a meteorite ploughed up some years ago at Admire, Lyon County, Kansas, U.S.A. As the metallic part is much rusted, probably a long interval of time elapsed between the fall and the find of the material. The meteorite, of which about 44 lb. weight is known to have been collected, belongs to the same group as the iron brought by Pallas from Siberia (1749), but approximates more closely in characters to the meteorite found in 1880 at Eagle Station, in Kentucky. It consists of a continuous mass of meteoric iron enclosing angular crystals of olivine (1 to 30 millimetres in diameter), the crystals having been in almost every case broken and afterwards cemented together by metallic material which had flowed into the fissures. Schreibersite, troilite and also small grains of chromite are comparatively abundant as constituents of the metallic portion, which forms about one-third of the whole mass.

ALASKA would seem to offer opportunities to the bryologist as well as to the gold-seeker. Although several collections of mosses have been made in that country from the year 1867 to the present time, Mr. J. Cardot and Mr. I. Thériot have placed on record twenty-nine new species as the result of collections made by the Harriman expedition in 1899. The descriptions of these, together with a general list of all known mosses from Alaska, are given in the *Proceedings* of the Washington Academy of Sciences bearing the date July 31 of this year. This does not, however, include a collection of more than 200 mosses which have been identified and named by Mr. R. S. Williams since this paper was written. The new species, which are given on the authority of the writers, except most of the Bryum species, for which M. Philibert is responsible, are fully diagnosed and illustrated. In addition, seventeen new varieties are recorded, and *Bartramiopsis Lescurii* is described in full with figures.

IT is not the happy fate of many botanical gardens to be able to put by a surplus of more than 1000*l.* in one year. Such is the announcement which appears in the thirteenth annual report of the Missouri Botanical Garden. The director, Dr. Trelease, presents his report, and in addition a memoir on the tribe Yucceæ of the order Liliaceæ. The latter is the result of a study extending over sixteen years, during which time large numbers of varieties have been examined in their native habitats and certain of them have been taken into cultivation. As this tribe is preeminently American, and in fact almost confined to the United States, and as the writer has taken advantage of every available opportunity to examine interesting or critical specimens, the results and opinions here recorded are extremely valuable. Very interesting by reason of the ordinary dependence of these plants upon the Pronuba moth for pollination is the reference to hybrids which have been raised. It will be noticed that one of the parents in many cases is *Yucca aloifolia*, this species being unique since it is usually self-pollinated. To the two genera Yucca and Hesperalœ, which are combined by Engler, is added a third genus, Samuela, with two species, instituted by Dr. Trelease; also the genus Yucca of Dr. Engler is split into three genera, Hesperoyucca, Clistoyucca and Yucca. The memoir is lavishly illustrated with more than one hundred figures reproduced from photographs.

THE Imperial Engineering Company, of Liverpool, has issued a pamphlet descriptive of apparatus for illustrating Prof. Hele Shaw's experiments on stream-line motions, both for use in schools and colleges and for original research.

A BRIEF account of the bibliography of Gilbert's "De Magnete" is given by Herr G. Hellmann (Berlin) in *Terrestrial Magnetism and Atmospheric Electricity*, vii. 2. It appears that only three editions of this work appeared, namely, Londini 1600, Sedini 1628, and Sedini 1633. Of the Sedini 1628 edition two varieties are known, differing in their title-pages. The rarest edition is the Stettin one of 1628, and of the two varieties that is rarest which has on its title-page the words "*Sumptibus* [*Authoris*].'

A NEW journal has been started in Glenville, U.S.A., bearing the title *The Aeronautical World*, and dealing with matters relating to aërial navigation of all kinds. It contains a large number of notes on events of current interest in this connection, lists of patents, and other information of this class. We should like to see rather more attention given to the difficulties which have still to be surmounted in connection with the problem of flight, leaving writers like Mr. H. G. Wells to indulge in "anticipations" of a speculative character as to the future of aërial navigation when these difficulties have been overcome. Still, such speculations have a certain attraction for those who cannot appreciate anything but accomplished results.

THE *Comptes rendus* of the Paris Academy of Sciences (July 21) contains a report on a paper by M. Torres dealing with a project for a navigable balloon with an interior keel. The idea contained in this project is very similar in general principle to that underlying M. Severo's ill-fated machine, namely, to bring all the forces acting on the balloon into the same horizontal line, with a view of minimising pitching. Accordingly M. Torres proposes a balloon with several compartments, containing a central beam suspended in its interior, and forming, with its attachments, a rigid internal keel. The propeller will then be attached at the end of this beam, and the car, which is to be reduced to the smallest possible dimensions, will be close up to the balloon. The fatal *Pax* disaster, however, raises doubts in regard to the last feature.

AN astronomical model called the "Rotaplane," devised by the Rev. C. Thomas and provisionally patented by him, has been submitted to us for examination. The model is intended to show the apparent diurnal motion of the horizon of any latitude with reference to the ecliptic at any time of the year. The direction of the polar axis is represented by an upright rod, to which the horizon can be inclined at an angle equal to the latitude of the desired place of observation. A semi-meridian is fixed to the horizon, and outside the whole is a flat ring to represent the plane of the ecliptic. By turning the polar axis, after setting the ecliptic at the correct inclination, the diurnal movement of the horizon with reference to the sun or other object in the ecliptic can be made manifest. An objection to the model as an educational instrument is that the horizon is only horizontal when the latitude for which it is set is 90°. The student of astronomy who understands the relationship between the fundamental planes of the horizon, equator and ecliptic might find it an advantage to fix his ideas by means of a model of this kind. But such a student would be in a position to use a celestial globe by which he could see the apparent motions, with reference to the horizon, of objects in any part of the celestial sphere instead of being limited to the ecliptic.

THE twenty-fourth Report of the Deutsche Seewarte, Hamburg, for the year 1901, exhibits the usual activity in the various pursuits in which the institution is engaged. Several meetings have been held at Berlin and Hamburg with the view of improving and expediting the telegraphic weather reports. In this most important object andin the establishment of a 7h. a.m. service, several of the European countries are to some extent participating, but the movement is due mainly to the impulse given to it by the Deutsche Seewarte. The sum of six thousand marks has been placed at the disposal of Dr. von Neumayer for the purpose of establishing special weather forecasts for agriculturists, probably on the same lines as those for the harvest forecasts issued by our own Meteorological Office. The collection of observations made at sea, for the construction of sailing directions and meteorological handbooks of the various oceans, has been vigorously carried on. Complete log-books were received during the year from 60 men of war and 538 merchant vessels, in addition to some 300 short logs from steamers. The majority of the voyages refer to the north and south Atlantic, but also include a considerable number in the Pacific and Indian Oceans. Telegraphic warnings of storms were issued on fifty-nine days; the number of telegrams (including those to lower the signals) exceeded 3000, but the percentage of success is not stated.

EXCLUDING the well-known thermophilic group of bacteria, it has generally been considered that an exposure to a temperature of 65° C., or frequently to a lower temperature than this, is rapidly fatal to all non-sporing forms of bacterial life. Messrs. H. L. Russell and E. G. Hastings, however, describe a micrococcus, isolated from milk, the thermal death point of which is 76° C. for an exposure of ten minutes. Not all the cells of this organism are equally resistant; as the temperature is raised to about 70° C. some of the cells begin to succumb, but a small residuum retain their vitality until 76° C. is reached (*Centr. f. Bakt., Zweite Abt.*, Bd. viii. p. 339). Using this organism, Messrs. Russell and Hastings have carried out some interesting observations upon the increased resistance of bacteria in milk pasteurised in contact with the air (*ib.*, p. 462). Heated in bouillon and in milk in closed vessels (sealed tubes) the thermal death point is approximately the same, viz. 76° C., but in milk heated in an open vessel the organism survived a temperature of 80° C. It was found that this resistance is due to the protection afforded by the membrane which forms when milk is heated freely exposed to the air, for in samples of sterile milk seeded with the organism and heated in an open beaker to 80° C., on subculturing numerous colonies were obtained from the membrane, while the milk below this was sterile.

SURRA, a disease affecting horses and other animals, and due to a protozoan parasite, the *Trypanosoma Evansi*, has been found to be very prevalent in the Philippines, causing the death of no less than 2000 of the army transport and cavalry horses in a period of six months. This disease, met with also in India and Burma, is now regarded as identical with nagana or the tsetse-fly disease of Africa. In India, the exact mode of transference of the disease from one animal to another has not been discovered, though certain "horse-flies" have been surmised to be the intermediaries. In the Philippines, Curry states that the intermediary is a fly, the *Stomoxys calcitrans*. The fly lays its eggs in the excrement of horses and cattle, in which its larvæ and pupæ thrive, and as the disease is almost always fatal, prophylactic measures must be employed, especially the destruction of the larvæ and pupæ in the excrements by treatment with lime or petroleum (*Amer. Med.*, July 19).

THE *Zoologist* for August contains notes on Erasmus as a naturalist, by Mr. G. W. Murdock, and a useful account by Mr. G. Smith, of Prof. Bachmetjew's experiments on the temperature of insects.

WE have received a copy of the first number of the *Rural Studies Series*, which contains the report of a lecture by the Rev. E. A. Woodruffe-Peacock on the manner in which horses—especially thoroughbreds—affect the grass-lands on which they are pastured, and the best manner of improving such pastures.

THE *Memorias* of the Scientific Society Antonio Alzate, vol. xvi., Nos. 5 and 6, contain an account, by Señor A. L. Herrera, of the means recently taken to mitigate the plague of mosquitoes from which the city of Mexico constantly suffers. A couple of men provided with tins of paraffin appear to have done wonders in the way of destroying the larvæ which infest the pools and sheets of water in the suburbs.

IN its report for the year 1901–1902, the committee of the Manchester Museum directs attention to the highly satisfactory and commendatory remarks on that institution and its work which appear in the Blue-book recently issued by the Commissioners on the University Colleges of the country. Among the collections received during the year is a fine series of shells presented by Mr. R. D. Derbishire, containing a number of rare forms and also examples of the range of variation presented by particular species. The lectures and addresses delivered during the year have proved attractive to the general public, and will be continued during the current session, when Prof. Hickson will discourse on reptiles, Prof. Weiss on club-mosses and ferns, and Prof. Dawkins on caves.

THE geology and petrography of part of the Ural region of Perm, in the upper basin of the Koswa, a tributary of the Kama, has been elaborately dealt with by MM. Louis Duparc and Francis Pearce (*Mém. de la Soc. de Physique de Genève*, xxxiv. 1902). In particular, the gabbros and dunites of Koswinsky are described, but there are also full accounts of the orography and hydrography of this region.

IN the *Papers* and *Proceedings* of the Royal Society of Tasmania for 1900–1901, a great many subjects are dealt with, including some useful general articles on the botany, the birds, the recent Mollusca, the minerals and the geology of Tasmania. In notes on the microscopic structure of some Tasmanian rocks, Mr. W. F. Petterd describes some aberrant members of the basalt family. Mr. W. H. Twelvetrees describes a new oxychloride of lead, under the name Petterdite. There are notes also on the discovery of amphibian remains in the permo-Carboniferous rocks.

WE have received the annual report for 1901 of the Geological Survey of New Jersey, by Mr. H. B. Kümmel, acting State Geologist. He refers to the fact that New Jersey is the chief clay-producing State, and that a new and exhaustive memoir of the clay deposits is in preparation. The report is accompanied by a memoir and map of the Green Pond Mountain region, a belt of Cambrian, Silurian and Devonian rocks which rest on an eroded surface of gneisses. There are notes on the iron, zinc and copper mines, on various artesian wells, and on the presence of chlorine in certain natural waters. It is recommended that the State authorities should conserve all watersheds likely to be drawn upon in future by large towns.

THOSE who attended the meeting of the Geological Society of London on January 8 were impressed with the lucid explanations of Glacial phenomena in the north of England then given by Prof. Percy F. Kendall and Mr. Arthur R. Dwerryhouse. Their observations recently published (*Quarterly Journal* Geol. Soc. for August) constitute most valuable contributions to the study of the Great Ice Age in this country. Prof. Kendall deals with the Cleveland Hills, and points out the evidence there existing of the former occurrence of a number of glacier-lakes or "extra-morainic" lakes, such as are produced whenever a glacier or ice-sheet advances against or across the general slope of a country and impounds the natural drainage. Evidence is given of such lakes of large and small dimensions in the Vale of Pickering, in Glaisdale and Eskdale, in Harwood Dale and at Hackness, lakes which must have been formed when the ice occupied the Vale of York and extended along the northern and eastern borders of the Cleveland area. The evidence is furnished by shore scarps, occasional lacustrine deltas with fan-like forms, by laminated lacustrine deposits such as the warp clays of the vales of Pickering and York, by overflow channels whence the impounded water escaped in gorges which trench the main watershed or sever spurs independent of the present natural drainage, and by crescentic valleys excavated in the face of a hill by water flowing round a lobe of ice. The Glacial deposits are, of course, fully considered from sections and from borings, some of which were carried out by Prof. Kendall. The assemblages of boulders and rock fragments lead to the conclusion that three main ice-movements affected the area—a northern from Scotland and Northumberland, a western from Stainmoor Pass and the Tees valley, and an eastern from the North Sea and Scandinavia. The general sequence which may be inferred from a study of the somewhat complicated phenomena is (1) the unobstructed passage of the Teesdale glacier to the coast; (2) the arrival of the Scandinavian ice; and (3) the invasion of the Scottish ice. The author finds no signs of the presence of the sea in the Cleveland area at any time during the Glacial period. Mr. Dwerryhouse describes the glaciation of Teesdale, Weardale and the Tyne valley, a region in which, like that of Cleveland, the higher tracts stood out as "nunatakkr," while the grounds beneath were buried by ice. He also points out that at the period of maximum glaciation a number of lakes were formed, owing to the obstruction of the drainage of lateral tributary-valleys by the ice of the main glaciers.

DRS. H. M. HILLER and W. H. Furness have privately issued bound copies of the "Notes of a Trip to the Veddahs of Ceylon," which were published in vol. iii. of the *Bulletin* of the Free Museum of Science and Art, Philadelphia (April, 1901). The "Notes" do not contain much that is new, but they are illustrated with several excellent photographs, the most interesting of which are those illustrating a Rock Veddah shooting (standing) with a bow and arrow, and one making fire with a "fire-drill."

THERE is in *The Reliquary and Illustrated Archaeologist* (vol. viii. No. 3) a well-illustrated article, by Mr. R. Quick, on the Carib stone implements in the Horniman Museum. These implements show the technical skill of the aborigines of the West Indies in working hard rock. Some of the implements are really remarkable examples of stone-work. One example which is figured has a most irregular contour; from its high finish it was evidently greatly prized, and was probably a symbolic religious object, of which the significance is at present unknown.

The early Christian monuments of the Isle of Man are becoming well known to students through the enthusiastic labours of Mr. P. M. C. Kermode. In the July number of *The Reliquary and Illustrated Archaeologist* he gives numerous illustrations of recently discovered crosses and runic and ogam inscriptions. One of the most interesting discoveries is a carved stone with very characteristic Scandinavian interlacing; on one side is seen the figure of Loki in the act of heaving stones at the otter which is eating the salmon it has just caught in the foss; above this is the steed Grani with the chest containing the hoard won by Sigurd upon his slaying the dragon Fafni.

MESSRS. PERKEN, SON and CO. have issued a new revised and enlarged edition (the eighth) of their "Beginner's Guide to Photography." The book is now in its seventieth thousand.

IN the article on "The Older Civilisation of Greece," which appeared in NATURE of August 21, the following corrections should be made:—P. 391, *col.* 1, *l.* 9 from bottom: *for* "the un-Aryan 'Pelasgian'" *read* "the probably un-Aryan 'Minoan'"; p. 393, *col.* 2, *l.* 12 from top: *for* "ἐν μυχῷ, Ἄργεος" *read* "ἐν μυχῷ Ἄργεος"; *ibid.*, *l.* 14 from top: *for* "casements" *read* "casemates"; p. 394, *col.* 1, Fig. 2: *for* "Clay Seal. Impression" *read* "Clay Seal-impression."

A MINUTE investigation of the composition of Pennsylvania petroleum has recently been carried out by Mr. C. F. Mabery, and an account of the hydrocarbons with boiling points above 216° C. is published in the *Proceedings* of the American Academy of Arts and Sciences (vol. xxxvii. p. 565). Hydrocarbons of the methane series from tridecane $C_{13}H_{28}$ to octocosane $C_{28}H_{58}$ have been isolated, and according to the molecular-weight determinations carried out by the freezing-point method the products obtained by the author as the result of repeated fractional distillation under low pressure are almost pure. No account appears to have been taken, however, of the possibility of the occurrence of different isomeric forms. In addition to these saturated compounds the hydrocarbons $C_{22}H_{44}$, $C_{23}H_{46}$, $C_{24}H_{48}$, $C_{26}H_{52}$ and $C_{27}H_{54}$ belonging to the ethylene series and $C_{28}H_{54}$ a homologue of acetylene, have been obtained.

MUCH remains to be learnt about the numerical relationships of the atomic weights of the elements. It has long been realised that when referred to the standard $O = 16$ many of the atomic weights approach whole numbers to an extent out of all proportion to the probabilities of the case. In the *Chemiker-Zeitung* for July 19, Mr. Arthur Marshall, as well as directing attention to this fact, shows that very remarkable relationships exist in many cases between the atomic weights of allied elements. Taking from the tables of the German Chemical Society the eighteen values given to two places of decimals, the theory of probabilities shows that the chances against their approaching as close as they do to whole numbers are as high as 4120 : 1. If, on the other hand, the atomic weights are referred to $H = 1$, there appears to be little or no tendency to become whole numbers. It is, however, only when certain of the atomic weights are referred to entirely different standards that the most striking relationships appear. The weights of the atoms of the halogen elements and silver, for instance, are exactly in the ratio $Cl : Br : Ag : I = 90 : 203 : 274 : 322$. In the case of the alkali metals the proportions are even simpler, $Li : NH_4 : Na : K : Rb = 7 : 18 : 23 : 39 : 85$. Again, the horizontal series, $V : Cr : Mn : Fe : Ni : Cu : Zn = 54 : 55 : 58 : 59 : 62 : 67 : 69$. It is yet premature to work out relationships for all the elements, for there is still great uncertainty about most of the atomic weights, but the values for most of the above substances are thoroughly well established.

MESSRS. HABER AND GEIPERT have been investigating the conditions under which aluminium is obtained by the electrolytic method, and have published their results in recent issues of the

Zeitschrift f. Elektrochemie. They point out that no trustworthy details of the method employed in the various works where the metal is now produced have hitherto been made public. Using a small experimental fusion cell, and the ordinary lighting supply current of the Karlsruhe Technical Institute, they were able to reduce alumina without difficulty and to obtain as much as 230 grams of the metal in one operation. The metal obtained was remarkably pure, one sample tested containing only ·05 per cent. C and ·034 per cent. Si. The mechanical tests made with six samples of the aluminium gave an average tensile strength of 21,425 lb. per square inch. The fused mixture used in the carbon cell contained 33 per cent. AlF_3, 33 per cent. NaF and 33 per cent. Al_2O_3, the high percentage of aluminium fluoride being conducive to fluidity. The current density employed was about 2800 amperes per square foot, and the E.M.F. varied between 7 and 10 volts. The authors, as the result of their experiments, have come to the conclusion that the steady improvement in the efficiency of the process as carried out in the aluminium works is due, not to secret modifications in the process, but to the more careful attention now given to the purity of the raw materials employed. They also point out that the carbon contained in the aluminium obtained in their experiments was not present in the combined form, and as it was graphitic in character they assume that it represented mechanically enclosed particles, due to the disintegration of the anode and kathode carbon. By remelting the aluminium, it was possible to remove a portion of this impurity from the metal. The necessity of employing carbons comparatively free from ash is insisted on, since any impurities of the carbon used will be found in the final product.

The additions to the Zoological Society's Gardens during the past week include a Vervet Monkey (*Cercopithecus lalandii*) from South Africa, presented by Mr. J. S. Sweetman; a Ring-tailed Lemur (*Lemur catta*) from Madagascar, presented by Colonel Ewart; a Tiger (*Felis tigris*) from India, presented by Mr. A. Forbes; two Two-spotted Paradoxures (*Nandinia binotata*) from West Africa, presented respectively by Major D'Arcy Anderson and Mr. Walter O'Brien; two Bank Voles (*Arvicola pratensis*) British, presented by Mr. G. T. Rope; a Broad-fronted Crocodile (*Osteoloemus tetraspis*) from West Africa, presented by Dr. W. F. Macfarlane; a White-collared Mangabey (*Cercocebus collaris*) from West Africa, a Black-faced Spider Monkey (*Ateles ater*) from Eastern Peru, a White-fronted Capuchin (*Cebus albifrons*) from South America, a Common Marmoset (*Hapale jacchus*), a Six-banded Armadillo (*Dasypus sexcinctus*) from Brazil, a Vulpine Phalanger (*Trichosurus vulpecula*) from Australia, two Petz's Conures (*Conurus canicularis*) from Mexico, a Western Boa (*Boa occidentalis*) from Argentina, deposited; five American Pochards (*Fuligula americana*) from North America, received in exchange.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES IN SEPTEMBER :—

Sept. 3. 7h. 59m. Minimum of Algol (β Persei).
6. 8h. 1m. to 11h. 43m. Transit of Jupiter's Sat. III.
13. 11h. 28m. to 15h. 11m. Transit of Jupiter's Sat. III.
15. Venus. Illuminated portion of disc = 0·945, of Mars = 0·948.
22. 9h. 2m. to 9h. 25m. Moon occults δ^1 Tauri (mag. 4·0).
22. 9h. 14m. to 10h. 2m. Moon occults δ^2 Tauri (mag. 4·7).
23. 8h. 13m. to 13h. 6m. Transit of Jupiter's Sat. IV.
23. 9h. 41m. Minimum of Algol (β Persei).
Sept. 23. 10h. 34m. to 11h. 12m. Moon occults 115 Tauri (mag. 5·4).
23. 12h. 0m. Sun enters Libra. Autumn commences.
23. 13h. 28m. to 13h. 53m. Moon occults 120 Tauri (mag. 5·3).
24. 17h. 0m. Mercury at greatest elongation (26° 11′ E.).
24. 17h. 32m. to 18h. 38m. Moon occults 26 Geminorum (mag. 5·1).
25. 13h. 40m. to 14h. 40m. Moon occults 68 Geminorum (mag. 5·0).
26. 6h. 30m. Minimum of Algol (β Persei).
27. 15h. 22m. to 15h. 38m. Moon occults ω Leonis (mag. 5·6).

NEW DISCOVERIES OF VARIABLE VELOCITIES IN LINE OF SIGHT.—In addition to the thirty-two binaries previously announced, Prof. Campbell records the data of six more spectroscopic binaries which have been detected with the Mills spectrograph; they are the following :—

φ *Persei* : $\alpha = 1^h\ 37^m$. ; $\delta = +50^\circ\ 11'$. The maximum variation as yet recorded is from +24 km. (December 16, 1900) to −12 km. (November 11, 1901). This star has bright hydrogen lines, Hγ appearing as a narrow absorption line with very bright borders.

η *Geminorum* : $\alpha = 6^h\ 09^m$. ; $\delta = +22^\circ\ 33'$. Maximum variation as yet recorded is from +14 km. (January 15, 1900) to 25 km. (February 2, 1902).

γ *Canis Minoris* : $\alpha = 7^h\ 23^m$. ; $\delta = +9^\circ\ 08'$. Range of variability as yet detected is from +40 km. (November 6, 1901) to +54 km. (December 22, 1901).

ζ *Herculis* : $\alpha = 16^h\ 38^m$. ; $\delta = 31^\circ\ 47'$. This is a well-known visual binary having a period of about thirty-three years, but the earlier observations of Belopolsky, Campbell and Newall in 1893, 1898 and 1897–99, respectively, did not establish the variability. However, by taking the means of these early observations and comparing them with the mean of the recently observed velocities determined at the Lick Observatory, it is found that the velocity has changed by about 4 km. since 1898.

α *Equueli* : $\alpha = 21^h\ 11^m$. ; $\delta = +4^\circ\ 50'$. The velocity of this star varied from −26 km. on June 25, 1900, to −2 km. on June 25, 1901, and then returned to −26 km. on June 2, 1902.

ο *Andromedae* : $\alpha = 22^h\ 57^m$. ; $\delta = +41^\circ\ 47'$. The range of variability, so far as it is yet known, is from −11 km. (October 9, 1900) to −20 km. (June 25, 1901).

Miss Maury, of the Harvard College Observatory, has discovered the composite character of the spectra of the two last-mentioned stars.

Out of the 350 stars observed up to date, 41 have proved to be spectroscopic binaries, giving a proportion of one binary to every eight stars observed, not taking into account a number of suspected cases which await confirmation.

The variable velocity of the sun has a double amplitude of only a few hundredths of a kilometre, and Prof. Campbell suggests that, with increased accuracy in our methods of observation, we shall probably find that there is a regular gradation from this comparatively minute quantity up to the much greater velocities already recorded, and that it will be found that a star which is *not* a spectroscopic binary is a rare exception (Lick Observatory *Bulletin*, No. 20).

THE NAMING OF NEW VARIABLE STARS.—No. 3808 of the *Astronomische Nachrichten* contains a list of the titles which have been assigned to the 24 variables discovered during the years 1900, 1901 and 1902 by the commission appointed to this duty. Among the 24 there are only four variables of the Algol type, one of which has the remarkable period of 31·3 days.

The published table gives the star's number in Chandler's catalogue, its temporary name, the assigned permanent name, the maximum and minimum magnitudes, and the data regarding the position for 1900.

THE SPECTRUM OF NOVA PERSEI.—Prof. Campbell and Mr. Wright subscribe a short note to the Lick Observatory *Bulletin*, No. 20, on the later spectrum of Nova Persei (1901).

Spectrograms, obtained throughout the autumn and winter, up to January 7, 1902, showed no appreciable difference from the immediately preceding ones, the fine dark H (calcium) line referred to in *Bulletin* No. 8 still remaining visible. It was suggested that the corresponding K line did not appear because there was no light in that region of the spectrum for the calcium vapour to absorb, but this suggestion has been proved incorrect